OIPE IAP78
SEP 06 2005
PATENT & TRADEMARK OFFICE

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total number of pages in this Submission: this page, plus

Complete if Known	
Application Number	09/543,284
Filing Date	4/5/2000
First Named Inventor	Boris Dmitrievich
Examiner Name	Thomas H. Stevens
Group/Art Unit	2123
Attorney Docket ID	Lubachevsky 10-2

ENCLOSURES *(check all that apply)*

If Fee Form is **not** included, but a fee is due, the Commissioner is Authorized to charge Deposit Account No **500732** of **Henry T. Brendzel,** and consider that appropriate requests have been made.

- [x] Fee Form ([x] Check included)
- [ ] Amendment/Response
  - [ ] After Final
- [ ] Affidavit(s)/Declaration(s)
- [ ] Extension of Time Request
- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority document(s)
- [ ] Response to Missing Parts/ Incomplete Application
  - [ ] Response to Missing Parts under 37 CFR 1.2 or 1.53
- [ ] Declaration (no Missing Parts Notice)
- [ ] Assignment Papers (for an Application)
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition Routing Slip (TO/SB/69) and Accompanying Petition
- [ ] To Convert a Provisional Application
- [ ] Power of Attorney, Revocation or Change of Correspondence Address
- [ ] Express Abandonment
- [ ] Terminal Disclaimer
- [ ] To Convert to Statutory Invention Registration
- [x] Postcard(s)
- [ ] Small Entity Statement
- [ ] Request for a Refund
- [ ] After Allowance Communication to group
- [ ] Appeal Communication to Board of Appeals and Interferences
- [ ] Appeal Communications to Group (Appeal Notice, Brief, Reply Brief)
- [ ] Proprietary Information
- [ ] Status Letter
- [x] Other **Appeal Brief**

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual Name	Henry T. Brendzel
Signature	Henry Brendzel — Date 9/5/05

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HENRY BRENDZEL — Henry Brendzel — 9/5/05
Name of Person Signing — Signature — Date

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I hereby certify that this correspondence is being electronically transmitted by facsimile to the United States Patent Office:

Henry Brendzel
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OIPE JAP78
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PTO/SB/17 Modified 1/05 – Henry Brendzel

FEE TRANSMITTAL		Complete if Known	
		Application Number	09/543,284
		Filing Date	4/5/2000
		First Named Inventor	Boris Dmitrievich Lubachevsky
		Examiner Name	Thomas H. Stevens
		Group/Art Unit	2123
TOTAL AMOUNT OF PAYMENT	($) 500	Attorney Docket ID	Lubachevsky 10-2

METHOD OF PAYMENT: Payment enclosed: ☒ Check Deposit Account Other:

The Commissioner is hereby authorized to charge indicated fees and other underpayments, and credit overpayments to:

Deposit Account Number **500732** Deposit Account Name **Henry T. Brendzel**

ENTITY STATUS: ☐ Small Entity Status is hereby requested

FEE CALCULATION

1. FILING FEE	Fee Description	Fee Paid

2. CLAIMS	Claims remaining	Highest Paid	Extra	Rate	Amount	Fee Paid
Total No. of Claims	0	20	0	50		
Independent Claims	0	3	0	200		
Multiply Dependent Claims						
		SUBTOTAL (2) ($)				0

FEE CALCULATION (cont.)

	Fee Description	Fee Paid
	Appeal Brief	500
	SUBTOTAL (2) ($)	0

SUBMITTED BY				Complete (if applicable)	
Typed or Printed Name	Henry T. Brendzel			Reg. Number	26,844
Signature	Henry Brendzel	Date	9/5/05	Deposit Account User ID	

09-07-05

AF — IFW

OIPE IAP78
SEP 06 2005
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application

Inventor(s)	Boris Dmitrievich Lubachevsky Alan Weiss	**Case Name**	Lubachevsky 10-2
Filing Date	4/5/2000	**Serial No.**	09/543,284
Examiner	Thomas H. Stevens	**Group Art Unit**	2123
Title	Discrete Event Parallel Simulation		

APPEAL BRIEF PUSUANT TO 37 CFR 1.191

Real party in interest

The real parties in interest are Lucent Technologies, 600 Mountain Ave. Murray Hill, NJ 07974-0636, the assignee of this application, and the inventors identified above.

Related appeals and interferences

There are no related appeals or interferences.

Status of claims

Claims 1-24 stand rejected.

- Claim 1 stands rejected under 35 USC 101 as being directed to non-statutory subject matter[1].
- Claims 1-24 stand 35 UCS 102(b) and being anticipated by Lubachevsky et al.

Status of amendments

The last amendment filed in this case (and admitted) is a supplemental amendment, dated April 4, 2005. An Office Action responsive to this amendment was issued on June 6, 2005, rejecting all claims, as indicated above.

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[1] The Examiner's assertion is that the "claimed invention is directed to non-statutory subject matter," and claim 1 is mentioned. No explicit rejection is made of claim 1, and no other claims are mentioned in the Examiner' comments. It is therefore only surmised that claim 1 is rejected, and the status of the other claims vis-à-vis 35 USC 101 is unclear.

Summary of Claimed Subject Matter

The invention is a method to efficiently simulate a physical system where many events occur, and the simulation is effected by use of concurrent processes that communicate with each other, where each process simulating a portion of the overall system and the processing are adapted to communicate with each other to enable interactions so that the entire system can be properly simulated.

The subject matter claimed in independent claim 1 is a method that performs simulations within an arrangement of N concurrently operating processing elements (PEs) where each PE simulates blocks of events, where each block includes M edge events, and in connection of simulating the edge events by a PE, information that originates at another PE is employed. The value of M is defined as approximately equal to e $\log_e N$.

Independent claim 21 defines a hardware arrangement comprising N PEs where each PE stores a specification of a subsystem (where the subsystems interact to form a whole system), and each of the PEs simulates events in blocks that include M edge events (M defined as above).

Independent claim 22 defines a storage element that includes a first (processing) module that, when executed in a processor, simulates operational events of a stored subsystem that is part of a system of interacting subsystems, in blocks that contain M edge events in addition to non-edge events (M defined as above), and a second module that outputs simulated operational events resulting from execution by the first module.

Grounds of Rejection to be Reviewed on Appeal

There are two primary issues to be resolved:

1. Whether the claimed invention is directed to statutory subject matter; and

2. Whether the reference cited by the Examiner anticipates the subject claims. A related issue is whether the Examiner gave proper consideration to the submitted Rule 132 Affidavit.

Argument

Issue (1): Is the claimed subject matter statutory?

The issue is framed in terms of "claimed subject matter" because the Examiner has not explicitly rejected any claim. In the remarks that relate to 35 USC 101 the Examiner refers to claim 1 (and only to claim 1), and while this gives rise to the notion that claim 1 is rejected, and applicants so assume, the status of the other claims vis-à-vis 35 USC 101 is certainly not clear.

The Examiner asserts that the claimed invention is directed to non-statutory subject matter "by way of a computer-based mathematical solver." More specifically, the Examiner asserts that (1) "there is no mention of a platform or application in mind," (2) the claims reflect 'a shell' of the function without a 'core' of a specific platform, and (3) the post-solution activity is from an outside agency and not by the invention itself.

Respectfully, the Examiner is wrong on all counts, and a proper analysis of the claims reveals that the claims do define statutory subject matter.

Although the Examiner's first assertion is that the claimed subject matter is a "computer-based mathematical solver," and a solver is a "thing," and "things" are clearly statutory subject matter, it is fair to note that claim 1 is a method claim, and that the Examiner is really asserting that the claimed *method* is directed to or contains a mathematical algorithm and on the whole is not statutory.

To reach a conclusion regarding whether a claim is statutory or not, a proper analysis requires the Examiner to (a) first determine what the applicant has invented and (b) determine what the applicant is seeking to patent – and by extension what the applicant has not invented and is NOT seeking to patent.

What was not invented and what was invented:

In the case at hand,

- Applicants did not invent simulation of a physical system by use of a computer.
- Applicants did not invent simulation of a physical system by use of a plurality of concurrently processing and interacting individual processing element.
- Applicants did not invent a mathematical algorithm that is used to simulate the physical system.

- Applicants did not invent a mathematical algorithm that is used to control the simulation of a physical system

What applicants did invent a method for simulating the operation of a physical system by use of a plurality of concurrently processing and interacting individual processing element, where the simulation is performed by way of simulating events that trigger other events, <u>and the events that are simulated by the arrangement of concurrently processing and interacting individual processing elements are taken in blocks of a chosen number of edge events</u>.

Respectfully, applicants believe that the Examiner failed to demonstrate that he determined what applicants have invented, and certainly has not indicated that applicants invented what the paragraph immediately above states.

<u>*What the applicant is seeking to patent*</u>

In claim 1, applicants seek to patent a method "for simulating events in a physical system." More specifically,

- Claim 1 specifies in step (a) "employing hardware that comprises N processing elements (PEs) that can communicate with each other." Clearly, there is no explicit or implicit mathematical algorithm in step (a) of claim 1.
- In step (b) claim 1 specifies "subdividing said physical system into N subsystems and assigning a different subsystem of said subsystems to each of said N PEs." This step also does not define a mathematical algorithm explicitly or implicitly.
- In step (c) claim 1 specifies that the simulation is in blocks of entities called "edge events" and specifies the sizes of the blocks in terms of a number of those "edge events." Specifying a number is not (and has never been asserted to be) a mathematical algorithm and, therefore, this step is also not defining – explicitly or implicitly – a mathematical algorithm.
- The last two steps of claim 1 also do not define a mathematical algorithm and, to summarize, none of the steps that make up claim 1 explicitly or implicitly include a mathematical algorithm.

In short, in claim 1 (and all claims that depend on claim 1) applicants seek to patent a non-mathematical process executed in a computer. The process is in the

technological arts, and is extremely useful because it enables one to determine whether the operation an event-triggered physical system (which most physical systems are) is proper, without actually running the system. Applicants' invention is particularly useful for simulating very complex systems and a simulation with a single processor would take an unreasonably long time to execute.

As for the Examiner's second assertion mentioned above, it is not clear what the Examiner means by a "shell" of a function, but clearly the assertion of "without a 'core' of a of a specific platform" is incorrect for the reason expressed above.

As for the Examiner's assertion third assertion mentioned above of no post solution activity, it is respectfully noted that the Examiner failed to identify what Examiner considers to be the mathematical algorithm or what the mathematical algorithm solves. Respectfully, one should not be allowed to make assertions about post solution activity until one identifies where the "solution" begins and ends and, certainly, one cannot rebut any assertions regarding post solution activity until the "solution" is identified. In the particular case at hand, however, as argued above, applicants respectfully submit that there is no mathematical algorithm and no solution of anything in any of the claim 1 steps and, therefore, the question of post-solution activity is meaningless. If the Examiner disagrees, the Examiner is invited to specify what the mathematical algorithm is that claim 1 defines.

Applicants further submit that even if, *arguendo,* in the course of implementing an edge event of some particular simulated system a mathematical algorithm must be executed (for example, whether a particular event occurs or does not occur depends on some mathematical equation), then the mathematical algorithm ends, and the solution comes into being *when the mathematical equation is solved relative to the simulated edge event.* In such a case, however, there is clearly a post-solution activity following the solution (end of the mathematical algorithm) because in order to simulate an edge event in one PE according to claim 1 information pertaining to an edge event from another of the communicating PEs is used. Thus, the post solution activity that the claim effectively specifies (if it is argued that the step of simulating an event might have some mathematical algorithm) is the communication of the solution from one PE to another PE.

To reaffirm, it is respectfully submitted that claim 1 does not define a mathematical algorithm, and that if a non-specified and not claimed (and thus not preempted) mathematical algorithm is executed sometime in the course of the method's execution, the results of that solution are employed in a post solution activity within the arrangement of interacting processing elements.

To restate the above:

1. *The claimed method defines no mathematical algorithm.* Though a simulation is algorithmic in the sense that all computer programs are algorithmic, there is nothing in the claims that defines a *mathematical* algorithm, and nothing in the idea of simulating a system that inherently requires the simulation algorithm to be a *mathematical* algorithm. Keeping in mind that the basic admonition in the law is to not pre-empt a mathematical algorithm (and all of the rules are set forth in order to determine whether a mathematical algorithm is pre-empted in cases where a claim specifies a mathematical algorithm), in claim 1 there is nothing mathematical that is claimed, and there is nothing mathematical that is pre-empted.
2. *The method is executed in a particular hardware arrangement* (N parallel processors, operating on N subsystems of a system to be simulated). There are many embodiments that would NOT infringe claim 1, even if whatever algorithm is used for simulating the system were a mathematical algorithm. The lack of pre-emption of any mathematical algorithm by virtue of the fact that only a very specific hardware arrangement can possibly cause an infringement clearly demonstrates that claim 1 is statutory.
3. *The claim relates to a real-live physical system*, as to what is simulated, which makes the method statutory. *ArrythmiaResearch Technology v. Corazonix Corp.* 958 F.2d 1053 (Fed. Cir. 1992).
4. *The claim, which defines a method for simulating a physical system, clearly has practical utility*, and therefore it is statutory. *State Street Bank & Trust v. Signature Financial Group*, 149 F.3d 1368 (Fed. Cir. 1998) cert denied.
5. *There is clearly a "post solution" activity* to whatever mathematical algorithm activity is taken while executing the claimed method (which activity is not claimed) in

that the results of that activity, relative to edge events, are communicated from one PE within the simulation arrangement to another PE within the simulation arrangement. Claim 1 is totally silent regarding the simulation of non-edge events.

Addressing independent claim 21, it defines an apparatus that includes N interacting processing elements (PEs). The Examiner has not explicitly asserted that this claim is non-statutory but inasmuch as the Examiner's assertion pertains to "the claimed invention," applicants address claim 21 and respectfully assert that the apparatus of claim 21 is clearly statutory. No indication to the contrary has been offered by the Examiner.

Addressing independent claim 22, it defines a storage element, and the above remarks relative to claims group B apply with equal force to claims group C.

Issue (2): Are claims 1-24 anticipated by Lubachevsly et al ("synchronous Relaxation for Parallel Simulations with Applications to Circuit-Switched Networks")?

In a March 10, 2004 Office action the Examiner paraphrased claim 1 and asserted that the claim is anticipated by the reference. In support of the assertion the Examiner pointed to specific passages in the reference. In the response, applicants traversed, explained that the reference cited by the Examiner seems to be one by Eick et al, where Lubachevsky is a co-author, and addressed each of the citations set forth by the Examiner, explaining why claim 1 is not anticipated.

In the next Office action, dated October 10, 2004, the Examiner apparently agreed that the relevant reference is the one by Eik et al, stated that applicants' remarks were unpersuasive, explained his reasoning, and reiterated the rejection.

Applicants believe that the Examiner's reading of the reference is incorrect, and in an effort to overcome the rejection, an affidavit was submitted by Dr. Matthew Andrews. Admittedly, because of a typographical error the caption of the affidavit stated that it is under 37 CFR 1.131 instead of 37 CFR 1.132, and the Examiner chose to not overlook the error. An RCE was filed on March 31, 2005, amending claim 1, adding some claims, presenting arguments in favor of patentability, and re-submitting the affidavit with a

corrected caption (enclosed).

In the Office Action dated June 6, 2005 the Examiner reiterated the 35 USC 102 rejection without remarks relative to applicants' arguments and without remarks relative to the submitted affidavit. In an interview summary dated June 30, 2005 the Examiner stated that "a 35 [sic] C.F.R 1.131 cannot overcome a 102(b) rejection." Aside from the Examiner's own typographical error, it is noted that what was submitted is a Rule 132 affidavit, which may be used for overcoming rejections based on art.

It is noted that at point 12the affidavit states,

(a) The specification of tasks for the PEs of the reference is in terms of a time interval, and not in terms of number of events.

(b) At those different time intervals Δ, the PEs may be called upon to compute different numbers of events.

(c) Other than in situations of the variation mentioned in point 11 above, at the end of each step, all of the PEs are at a known time instant (iΔ).

(d) Even in situations of the variation mentioned in point 11 above, the method aims to have all PEs at the aforementioned time instant, and only those PEs that have more than B number of events will be at some other instant.

(e) In any event, the method described in the reference operates primarily with time intervals as the demarcation points between computation steps rather than number of evens as demarcation points between computation steps.

In contradistinction, claim 1 specifies operation in terms of blocks of number of events -- and not time horizons. More particularly, it defines blocks of events that contain a specified number of <u>edge</u> events (in contrast to non-edge events)

Also, it is noted that the affidavit states at point 8 that the time interval D can be chosen on the order of "N/log N," where N is the number of PE's used (taking the liberty to change the letter M that is in the reference and in the affidavit to the letter N, which is used in applicants' claim 1). In contradistinction, claim 1 specifies "log N." Clearly "N/log N" is not the same as "log N."

It light of the above, it is respectfully requested that the Examiner has not given proper weight to applicants arguments, and it appears that the Examiner has given no consideration whatsoever to the affidavit.

It is also respectfully submitted that a reading of the reference as a whole (and not only a sentence here and a sentence there) clearly indicates that claim 1 is directed to subject matter that is not disclosed in the reference.

It is respectfully submitted that the Examiner erred in his assertion that the claimed invention is directed to non-statutory subject matter, and also erred in his assertion of anticipation by the above-identified reference. Applicants therefore respectfully request that the Board return the case to the Examiner with a directive to rescind the rejections and to allow all claims.

Respectfully,

By Henry T. Brendzel
Henry T. Brendzel, Attorney
Reg. No. 26844
973 467-2025

Date: 9/5/05

Claims Appendix

1. A method executed in hardware for simulating events in a physical system comprising the steps of:

a) employing hardware that comprises N processing elements (PEs) that can communicate with each other;

b) subdividing said physical system into N subsystems and assigning a different subsystem of said subsystems to each of said N PEs;

c) in a simulation step, each of said PEs concurrently simulating a respective block of events that occur in each respectively assigned subsystem, where said block includes M edge events, where M is approximately e $\log_e N$, e is approximately 2.71828, and an edge event is an event whose simulation in a processing element is directly affected by information originating in another processing element;

repeating step c) a chosen number of times; and

outputting results of said simulations from each of said N PEs.

1. The method of claim **1** where said simulation step comprises one or more iterations.

2. The method of claim **1** where each of said iterations comprises a simulation phase followed by a communication phase and an assessment phase.

3. The method of claim **2** where, in each communication phase, each of said PEs shares information with one or more other PEs from said N PEs, which information is needed by said other PEs to simulate edge events of said other PEs.

4. The method of claim **3** where said information shared by each PE in a communication phase of an iteration is related to events simulated by said each PE in said iteration.

5. The method of claim **3** where said assessment phase carried out by each of said PEs comprises the steps of

determining whether the existence of a simulation error can be excluded, and

directing that another simulation iteration is to take place when the existence of a simulation error cannot be excluded.

6. The method of claim **5** further comprising a floor advancement step that is carried out in each of said PEs when said step of determining in said assessment phase concludes that there are no simulation errors in a simulation iteration, where the advancement step advances a simulation floor time of a present simulation step to form a modified simulation time floor, for simulating another block of M events in a next simulation step.

7. The method of claim **5** further comprising a step of advancing a simulation floor time from a simulation floor time of a present simulation step, to form a modified simulation floor time, for starting from said modified simulation floor time the simulation of another block of M events in a next simulation step, when said step of determining in said assessment phase concludes that there are no simulation errors in said present simulation step.

8. The method of claim **7** where said modified simulation floor time corresponds to the earliest simulation time of the M^{th} edge event simulated by said N PEs in said present simulation step.

9. The method of claim **3** where events are simulated seriatim in each simulation phase.

10. The method of claim **9** where for simulating a second event following a simulation of a first event,

a time interval is identified between a simulation time of said first event and a simulation time of said second event, and

said second event is identified for simulation.

11. The method of claim **10** where said second event is identified for simulation following a step of accounting for simulation of said first event and simulation of events in said other PEs from said N PEs.

12. The method of claim **11** where said accounting is based on present knowledge of states of said other events.

13. The method of claim **11** where said accounting for simulation of events in said other PEs from said N PEs accounts for events simulated during said time interval.

14. The method of claim **10** where said second event is identified by employing a first random number.

15. The method of claim **10** where said time interval is identified with a second random number.

16. The method of claim **15** where said second random number is set to said first random number.

17. The method of claim **14** where said first random number is derived from a random variable having a uniform distribution.

18. The method of claim **14** where the seriatim simulation of each event in said block of M events, in a first iteration starting from a given simulation floor time, employs an independently derived random number from said random variable, forming thereby a sequence of random numbers, and simulation of said block of M events in all subsequent

iterations starting from said given simulation floor time employs said sequence of random numbers.

19. The method of claim **17** where the sequence of random numbers employed in one simulation step is different from a sequence of random numbers employed in another simulation step.

20. Apparatus that includes N interacting processing elements (PEs), the improvement characterized by:

each of said N PEs storing a specification of a subsystem of a system composed of interacting subsystems; and

said N PEs (a) executing a selected number of simulation steps, and in each simulation step each of said PE's simulates a block of operational events of its associated subsystem, where a block contains M edge events, where M is approximately equal to log N, and an edge event is an event whose simulation in a processing element is directly affected by information originating in another processing element, and (b) outputting results of the simulations.

21. A storage element comprising:

a first module that, when executed in a processor, simulates operational events of a stored subsystem that is part of a system of interacting subsystems, primarily in blocks that contain M edge events, in addition to non-edge events, where M is approximately equal to log N, and an edge event is an event whose simulation in a processing element is directly affected by information originating from simulations by another module that is substantially the same as said first module, which other module is executed in another processor; and

a second module that outputs simulated operational events resulting from execution of said first module.

22. The storage element of claim **21** further comprising a third module that communicates with said other module.

23. The storage element of claim **22** further comprising a fourth module that assesses whether, based on information received by said third module, any of said M edge events need to be re-simulated.

IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

Patent Application

Inventor(s)	Boris Dmitrievich Lubachevsky Alan Weiss	Case Name	Lubachevsky 10-2
Filing Date	4/5/2000	Serial No.	09/543,284
Examiner	Thomas H. Stevens	Group Art Unit	2123
Title	Discrete Event Parallel Simulation		

COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450

SIR:

AFFIDAVIT UNDER 37 CFR 1.132

1. My name is Matthew Andrews
2. I received a PhD in Theoretical Computer Science from MIT in 1997. I am currently a member of technical staff in the Mathematics of Networks and Systems Department at Bell Labs in Murray Hill, NJ. Much of my work involves performing simulations of communication networks. I am familiar with the theory of optimistic parallel simulation.
3. Mr. Brendzel, who represented that he is the attorney of record in the above-identified patent application, requested that I read a 1993 article by Eick et al., titled "Synchronous Relaxation for Parallel Simulations with Applications to Circuit-Switched Networks" (henceforth, the "reference.")
4. Mr. Brendzel also requested that I read the above-identified patent application.
5. The reference teaches a method where a plurality of PEs are arranged to work in parallel. The tasks assigned to the PEs are the simulation of events in its pre-assigned subsystem, in steps of predefined time slices.
6. During each iteration a PE constructs the sequence of events of its subsystem during the interval (i-1)D and iD.
7. Clearly, therefore, the reference teaches a <u>time-interval-based system</u>.
8. There is no definitive language that specifies the duration of that interval (D), other than it can be chosen to be "on the order of" M/logM, where M is the number of PEs used.
9. I note that, universally, a term like "log M" implies that the logarithm is taken to the base *e*, where *e* is the base to the natural system of logarithms, having a numerical value of approximately 2.71828.

10. That means that the chosen time interval is increased with increases in the number of PEs used, but not quite linearly.
11. The reference also teaches a variation of the time slice approach, where a combination of time and number of elements is employed. Specifically, an interval (step size D) is chosen, but at each iteration "at most B" events belonging to the system are simulated. If during the time interval there are fewer than B events, the simulations proceeds to completion with that smaller number of events being simulated, and at the end of each iteration all or almost all of the PE's are at a common point in time. Only those PE's that experience more than B events in the operating time interval end up at a different points in time.
12. To summarize,

    (a) the specification of tasks for the PEs is in terms of a time interval, and not in terms of number of events.

    (b) At those different time intervals D, the PEs may be called upon to compute different numbers of events.

    (c) Other than in situations of the variation mentioned in point 11 above, at the end of each step, all of the PEs are at a known time instant (iD).

    (d) Even in situations of the variation mentioned in point 11 above, the method aims to have all PEs at the aforementioned time instant, and only those PEs that have more than B number of events will be at some other instant.

    (e) In any event, the method described in the reference operates primarily with time intervals as the demarcation points between computation steps rather than number of evens as demarcation points between computation steps.
13. Additionally, I note that the reference addresses events without distinction between events that have no effect on adjacent subsystems (which are handled by other PEs) and events that do have an effect on adjacent systems. The latter type of events are called edge events.
14. I further note that, in contradistinction, the above-identified application focuses on edge events as to the number of events that are to be handled in each step of the PE's operation.
15. A method that focuses on or is based on edge events is, of course, quite different from a method that does not, and a method that specifies PE steps in terms of (a) events which (b) are edge events, is totally different from a method that focuses on events that occur within a specified time interval.
16. I note still further that the above-identified application chooses the steps to contain a number of edge events that is approximately equal to e $\log_e$ N, where N is the number of PEs.
17. Aside from the issue that the number N relates to edge events rather than to all events, it is noted that the number N grows much more slowly than in the reference. Whereas in the reference the number of events grows almost linearly (see point 10 above), in the above-identified application that number grows logarithmically.

18. Based on the above, it is my professional conclusion that the reference does not teach controlling a step size based on events only, does not teach controlling a step size based on edge events, and does not teach controlling a step size logarithmically with the number of available PEs.

Matthew Andrews

March 30, 2005